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## The Mammalian Fauna and Ectoparasites of George Washington Birthplace National Monument, Westmoreland County, Virginia

Harry F. Painter and Ralph P. Eckerlin  
Natural Sciences Division  
Northern Virginia Community College  
Annandale, Virginia 22003

The George Washington Birthplace National Monument (GWBNM) property includes about 218 hectares on the Potomac River in Westmoreland County, Virginia, about 130 km southeast of Washington, D.C. The property is in the Coastal Plain physiographic province and is very flat. In addition to the historic site and interpretive buildings surrounded by lawns and shrubs, a number of different habitats are found on the property. These include about 80 hectares of mixed-age woodlands dominated by loblolly pine (*Pinus taeda*) but with some hardwoods, mostly white oak (*Quercus alba*), tulip tree (*Liriodendron tulipifera*), and red maple (*Acer rubrum*), 60 hectares of farmland used for hay, 220 hectares of freshwater marsh adjacent to Pope's Creek, several meadows, two freshwater ponds, and a riverfront beach on the Potomac River which is tidal and slightly brackish. No inventory of the mammals of the GWBNM exists. The purpose of this report is to list the mammals observed at GWBNM and to annotate the list with observations and comments on ecology and behavior. The small mammals trapped and handled were examined for ectoparasites, which are also reported herein.

### Materials and Methods

Small mammals were sampled primarily by trapping with Sherman and Hav-a-hart live traps. Museum Special snap-back traps and larger rat traps were used occasionally. Large mammals were observed as we walked the

grounds or drove the roads, mostly at night. Mist nets were used on two occasions to sample bats.

Specimens were caught, identified, and released. A few of the small mammals killed in traps were saved as skins and skulls and deposited as vouchers in the collection at Northern Virginia Community College. Identifications were based on field characters as given in Burt & Grossenheider (1956) and Webster et al. (1985).

Observations began in March 1986 and continued at irregular intervals through April 1989. Observations were made in all months of the year except December. Twenty-four days of observing were performed with 1-13 observers. Sampling involved 13 nights of trapping. Approximately 480 man hours were spent in the field.

Eleven species of mammals were handled and examined for ectoparasites. Most were brushed with a test tube brush over a white pan and their parasites were then collected from the pan with forceps. Some live-trapped rodents were placed in a paper bag with paradichlorobenzene crystals (PDB) for 2-3 minutes after which the host animal was identified, sexed, and released. Later, the PDB was examined for the presence of ectoparasites. Parasites were preserved in 70% ethanol, decolorized in 10% KOH, dehydrated in an ethanol series, cleared in xylene, and mounted on slides in Canada balsam. These parasites were deposited as voucher specimens in the Northern Virginia Community College parasite collection or the U. S. National Tick Collection.

## Results

A list of mammals encountered at GWBNM is presented below. Twenty-two species of mammals belonging in 12 families of seven orders were observed or collected. Mammal names follow Jones et al. (1992).

*Didelphis virginiana* Kerr - Virginia opossums were seen on four occasions while we were driving roads at night. They were observed in meadow and woodland habitats and are considered common.

*Blarina brevicauda* (Say) - Three northern short-tail shrews were trapped in meadow habitats. Although the southern short-tail shrew, *Blarina carolinensis* (Bachman), has been reported to be sympatric with *B. brevicauda* in Westmoreland County (Pagels and French, 1987), it was not seen in this study.

*Scalopus aquaticus* (Linnaeus) - Runs of the eastern mole were very numerous in the sandy soil near Pope's Creek, but only a single specimen was captured. It is likely that this is the only species of mole at GWBNM.

*Eptesicus fuscus* (Beauvois) - A single adult male big brown bat was caught by hand in the employee residence building in May 1988. Large bats seen flying at dusk on several occasions may have been this species.

*Lasionycteris noctivagans* (LeConte) - One silver-haired bat was caught in a mist net over a stream in April 1988. These bats migrate northward through the area in the spring. Few records exist for this species in Virginia. The intestinal fluke, *Urotrematulum attenuatum*, was reported from this specimen (Eckerlin, 1988).

*Sylvilagus floridanus* (J. A. Allen) - The eastern cottontail was the only rabbit observed. It was seen on ten occasions in fields, meadows, and early successional stage shrub-woodland habitat.

*Glaucomys volans* (Linnaeus) - A southern flying squirrel was seen once at dusk in June 1988 as it emerged from a tree hole in a white oak.

*Marmota monax* (Linnaeus) - Woodchucks were common (eight sightings) in meadows and open areas along roads. Woodchucks were regarded as pests by GWBNM personnel because earthen mounds at den openings interfered with mowing operations.

*Sciurus carolinensis* Gmelin - Sightings of eastern gray squirrels were made in all months that we visited the site. This species was commonly seen near the residence and interpretive buildings where deciduous trees were common. The single nest of this species that we examined yielded 2 fleas, *Orchopeas howardi* (Baker).

*Microtus pennsylvanicus* (Ord) and *Microtus pinetorum* (LeConte) - A single specimen each of the meadow

vole and the woodland vole was trapped in dry meadow habitat. Neither species was caught in wet meadow or marsh areas.

*Peromyscus leucopus* (Rafinesque) - Thirty-nine white-footed mice were trapped and most were released. This was the most common small mammal on the GWBNM as judged by our trapping success. White-footed mice were caught around buildings and in both deciduous and coniferous woodlands.

*Ondatra zibethicus* (Linnaeus) - Common muskrats were seen on four occasions in the water of Pope's Creek. The mound nests of the common muskrat were seen in the marshes adjacent Pope's Creek.

*Oryzomys palustris* (Harlan) - Marsh rice rats, nine individuals, were trapped on six of 13 trap nights. They were found in the marshes or in wet meadows near the marsh.

*Castor canadensis* Kuhl - American beavers were seen on only two occasions although their cuttings were seen on every visit. A young beaver was seen at night in the rain while it was walking on a road.

*Mus musculus* Linnaeus and *Rattus norvegicus* (Berkenhout) - The non-native house mouse and Norway rat were both common around the barns and out buildings where domestic animals (pigs, cows, sheep) and their food were kept. They were regarded as pests by the GWBNM personnel because they stole food and gnawed on wooden structures. Traps set in the animal buildings on ledges and rafters caught no black rats, *Rattus rattus* Linnaeus.

*Urocyon cinereoargenteus* (Schreber) - A single common gray fox was seen at dusk on 23 August 1987 crossing from a cultivated field into a pine woods.

*Procyon lotor* (Linnaeus) - Common raccoons were seen, usually at night, on six of 13 visits. A group of five was seen in a cornfield when ripe corn was available.

*Mephitis mephitis* (Schreber) - A striped skunk was seen on only one occasion.

*Mustela vison* Schreber - Tracks of mink were seen in the sand and mud along the Potomac River.

*Odocoileus virginianus* (Zimmerman) - White-tailed deer were seen on every visit to the GWBNM. As many as 21 were counted on each of two occasions. The herd included a mature six point buck and an animal that was partially albinistic, with large patches of white on the flanks.

A list of ectoparasites found on the 65 small mammals handled is presented in Table 1. The terms prevalence and mean intensity are used as defined by Margolis et al. (1982).



Table 1. Prevalence and intensity of ectoparasites from 65 small mammals examined from the George Washington Birthplace National Monument, Westmoreland County, Virginia.

Mammal species	Parasite Prevalence	Parasite	Parasite Mean intensity
<i>Blarina brevicauda</i>	1/2	<i>Ctenophthalmus pseudagyrtes</i> Baker, 1904	1.0
<i>Scalopus aquaticus</i>	0/1		
<i>Eptesicus fuscus</i>	0/1		
<i>Lasionycteris noctivagans</i>	0/1		
<i>Mus musculus</i>	0/6		
<i>Rattus norvegicus</i>	0/3		
<i>Sciurus carolinensis</i>	1/1	<i>Orchopeas howardi</i> (Baker, 1895)	2.0
<i>Microtus pennsylvanicus</i>	1/1	<i>Dermacentor variabilis</i> (Say, 1821)	1L;18N * <sup>1</sup>
<i>Microtus pinetorum</i>	1/1	<i>Ctenophthalmus pseudagyrtes</i> Baker, 1904	1.0
<i>Oryzomys palustris</i>	0/9		
<i>Peromyscus leucopus</i>	11/39	<i>Orchopeas leucopus</i> (Baker, 1904)	2.8
	7/39	<i>Epitedia wenmanni</i> (Rothschild, 1904)	2.0
	4/39	<i>Stenoponia americana</i> (Baker, 1899)	1.3
	2/39	<i>Dermacentor variabilis</i> (Say, 1821)	L 2.5 <sup>2</sup>
	1/39	<i>Amblyomma americanum</i> (Linnaeus, 1758)	L 1.0
	1/39	<i>Cuterebra</i> sp.	1.0

\* L= larva; N= nymph

<sup>1</sup> Vouchers deposited into U. S. National Tick Collection, RML accession number 119182

<sup>2</sup> Vouchers deposited into U. S. National Tick Collection, RML accession numbers 119180, 119181

### Discussion

We observed that deer were mostly small and appeared stunted, although no hard data were collected. In the early spring, we noted that the browse, consisting mostly of briar (*Smilax* spp.) and poison ivy (*Rhus radicans*), was eaten down to bare stubs. It was possible to see for considerable distances where the deer had removed the understory cover. We believe that the deer herd has probably reached or exceeded the carrying capacity of the property, and that the herd has members that are stunted and inbred. Albinism is usually inherited in other mammalian species as a Mendelian recessive trait and has been seen in other deer herds. For the trait to express itself phenotypically in an individual, there was probably interbreeding between deer who were carriers of the allele. This would suggest close inbreeding among members of this small population.

A reduction of the deer herd would be desirable from a management point of view. McShea & Rappole (1992) have shown that understory cover increased and provided habitat for a greater number and variety of small mammals and ground nesting birds when the impact of

deer browsing was reduced or eliminated. The deer would probably benefit as a result of reduced transmission of parasites and diseases, and an increase in available food.

From a human health point of view, fewer deer in an area will equate to fewer risks of human cases of Lyme disease transmitted by the deer tick, *Ixodes dammini* Spielman, Clifford, Piesman, & Corwin, 1979 as shown by Steere & Malawista (1979) and Steere et al. (1983). Recently, *Ixodes dammini* has been reduced to a junior synonym of the black-legged tick, *Ixodes scapularis* Say, 1821 by Oliver et al. (1993). Since the GWBNM property is heavily used by humans, this may be an important consideration. However, no deer ticks were found in this study.

All flea species found are common parasites on their host species in Virginia (Benton, 1980), as is the botfly, *Cuterebra* sp., yet Westmoreland County is a new locality for each. The American dog tick, *Dermacentor variabilis*, is the most important vector of Rocky Mountain Spotted Fever in the United States, it transmits tularemia to humans and many wildlife species, and it causes tick paralysis (Sonenshine, 1979). Westmoreland County is a

new locality for this common and widespread tick. The lone star tick, *Amblyomma americanum*, is also an important vector of Rocky Mountain Spotted Fever and it was previously reported from Westmoreland County by Sonenshine (1979).

The number of mammal species encountered in this study (22) is comparable to that found at other sites of about the same size in eastern Virginia. At Presquile National Wildlife Refuge in Chesterfield County, Jackson et al. (1976) reported 22 species but included no bats. Seventeen species were common to both Presquile and GWBNM. At Mackay Island National Wildlife Refuge in the City of Virginia Beach, de Rageot (1992) found 19 species of mammals, 12 of which were also found at GWBNM. Differing amounts of effort, times of observations, methods employed (both studies cited above examined owl pellets), habitat differences, and geographical differences make more direct comparison futile. At GWBNM, as at the other sites where preliminary inventories have been made, additional observation will surely add additional species of mammals to the list.

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